

CLAIMS

1. A device for installing a pipe or casing, using an external driver, comprising:

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a first portion adapted to capture an axial rotational force supplied by said external driver along a central axis;

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a second portion adapted to store energy derived from said rotational force and to convert said energy to an impact force; and

a third portion adapted to transmit said impact force to said pipe or casing.

2. The device of claim 1 wherein said external driver is a rotary drill stem.

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3. The device of claim 1 wherein said first portion comprises:

a carrier device surrounding a section of said external driver; and

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means to connect said carrier device to said external driver.

4. The device of claim 3 wherein said means to connect said carrier device comprises clamps to directly engage said external driver.

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5. The device of claim 3 wherein said means to connect said carrier device comprises slips to directly engage said driver.

6. The device of claim 3 wherein said carrier device comprises a generally hollow cylinder, adapted to accommodate a section of said external driver through an axially central aperture and to accommodate part or all of said second portion of said device.

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7. The device of claim 1 wherein said first portion is further adapted to capture a downward force applied to said external driver, to store said captured downward force, and to transmit said stored downward force to said pipe or casing.

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8. The device of claim 7 wherein said downward force is captured, stored and transmitted by one or more springs.

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9. The device of claim 7 where said transmittal of said downward force is essentially constant as said pipe or casing is installed.

10. The device of claim 1 wherein said second portion comprises:

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an upper portion which rotates about said central axis under said rotational force; and

a lower portion.

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11. The device of claim 10 wherein said upper portion further comprises a downward facing inclined surface.

12. The device of claim 11 wherein said lower portion further comprises an upward facing inclined surface.

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13. The device of claim 12 wherein said inclined surfaces cooperate to move said upper portion away from said lower portion along said central axis upon partial rotation of said upper and lower portions, and further cooperate to allow said upper portion to move back towards said lower portion along said central axis upon further relative rotation of said upper and lower portions.

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14. The device of claim 13 wherein said further cooperation comprises a sudden cessation of direct contact between said inclined surfaces.

5 15. The device of claim 14 further comprising at least one spring, said at least one spring being adapted to compress when said upper portion moves away from said lower portion and adapted to expand when said upper portion moves back towards said lower portion.

10 16. The device of claim 1 wherein said third portion comprises:

an upper surface, adapted to receive said impact force from said second portion; and

15 a lower surface in direct contact with an uppermost part of said pipe or casing.

17. The device of claim 16 wherein said third portion further comprises an outlet to allow air to escape from said third portion.

20 18. The device of claim 1 further comprising a fourth portion, said fourth portion comprising a shaft shaped to encircle said external driver while fitting within said first, second and third portions along said central axis.

25 19. A method of installing a pipe or casing, comprising:

capturing rotational force supplied by an external driver;

storing energy derived from said rotational force;

30 converting said energy to an impact force; and

transmitting said impact force to said pipe or casing.

20. The method of claim 19, further comprising:

5 capturing a downward force applied to said external driver; and

transmitting said downward force to said pipe or casing.

21. A device for installing a pipe or casing using an external rotary driver
10 which produces a rotational force, comprising:

means to directly connect said device to said external rotary driver;

a central shaft encircling a portion of said external rotary driver;

15 a hammer;

an anvil;

20 one or more springs;

a generally cylindrical carrier device;

25 wherein said carrier device and said hammer are operatively connected to rotate in concert under said rotational force;

wherein said rotational force causes said hammer to provide a first impact force to said anvil; and

30 wherein said first impact force causes said anvil to provide a second impact force to said pipe or casing.

22. The device of claim 21, wherein said means to connect said device to said external rotary driver comprises clamps.

5 23. The device of claim 21 wherein said means to connect said device to said external rotary driver comprises slips.

24. The device of claim 21 wherein a downward force is applied to said external rotary driver, and further comprising:

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one or more springs adapted to capture said downward force; and

to transmit said downward force to said pipe or casing.

15 25. The device of claim 24 where said transmittal of said downward force is essentially constant as said pipe or casing is installed.

26. A device for installing a pipe or casing, using an external driver, comprising:

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a first portion adapted to capture an axial rotational force supplied by said external driver along a central axis; and

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a second portion adapted to store energy derived from said rotational force, to convert said energy to an impact force and to transmit said impact force to said pipe or casing.

27. The device of claim 26 wherein said external driver is a rotary drill stem.

30 28. The device of claim 26 wherein said first portion comprises:

a carrier device surrounding a section of said external driver; and

means to connect said carrier device to said external driver:

5 29. The device of claim 28 wherein said means to connect said carrier device comprises clamps to directly engage said external driver.

30. The device of claim 28 wherein said means to connect said carrier device comprises slips to directly engage said driver.

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31. The device of claim 28 wherein said carrier device comprises a generally hollow cylinder, adapted to accommodate a section of said external driver through an axially central aperture and to accommodate part or all of said second portion of said device.

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32. The device of claim 26 wherein said second portion comprises:

an upper portion which rotates about said central axis under said rotational force; and

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a lower portion.

33. The device of claim 32 wherein said upper portion further comprises a downward facing inclined surface.

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34. The device of claim 33 wherein said lower portion further comprises an upward facing inclined surface.

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35. The device of claim 34 wherein said inclined surfaces cooperate to move said upper portion away from said lower portion along said central axis upon partial rotation of said upper and lower portions, and further cooperate

to allow said upper portion to move back towards said lower portion along said central axis upon further relative rotation of said upper and lower portions.

5 36. The device of claim 35 wherein said further cooperation comprises a sudden cessation of direct contact between said inclined surfaces.

10 37. The device of claim 36 further comprising at least one spring, said at least one spring being adapted to compress when said upper portion moves away from said lower portion and adapted to expand when said upper portion moves back towards said lower portion.

15 38. The device of claim 26 wherein said second portion further comprises an outlet to allow air to escape from said second portion.

39. The device of claim 26 further comprising a third portion, said third portion comprising a shaft shaped to encircle said external driver while fitting within said first and second portions along said central axis.

20 40. The device of claim 26 wherein a downward force is applied to said external driver, and further comprising:

one or more springs adapted to capture said downward force; and

25 to transmit said downward force to said pipe or casing.

41. The device of claim 40 where said transmittal of said downward force is essentially constant as said pipe or casing is installed.